DOCUMENT RESUME

ED 079 029 SE 014 890

AUTHOR	Payne, Leonard O.
TITLE	Introduction to the Plant World, Science (Experimental): 5311.11.
INSTITUTION	Dade County Public Schools, Miami, Fla.
PUB DATE	71
NOTE	21p.; An Authorized Course of Instruction for the Quinmester Program
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Behavioral Objectives; *Biology; Instruction; Instructional Materials; Objectives; Resource Materials; *Secondary School Science; *Teaching Guides; Units of Study (Subject Fields)
IDENTIFIERS	*Quinmester Program

ABSTRACT

This unit of instruction was designed as a laboratory-oriented course for very low achievers to show how plants are involved in every aspect of their lives. Detailed practical experience in handling and investigating plants, and the use of films, models, and field trips are combined with basic minimal research to guide the student to a better understanding of the importance of the plant kingdom. The booklet lists the relevant state-adopted texts and states the performance objectives for the unit. It provides an outline of the course content and suggests experiments, demonstrations, field trips, speakers or resource people, and topics for student projects, reports, and additional innovative activities. Also listed are related problems, and relevant films and models available from the Dade County Audiovisual Center. Reference books are recommended, and a master sheet is provided relating each suggested activity to the specific performance objectives. (JR)

FILMED FROM BEST AVAILABLE COPY

ED 079029

U.S. DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

INTRODUCTION TO THE PLANT WORLD

5311.11
5312.11
5313.11

SCIENCE
(Experimental)

DADE COUNTY PUBLIC SCHOOLS

DIVISION OF INSTRUCTION • 1971

SE 014 870

ED 079029

INTRODUCTION TO THE PLANT WORLD

5311.11
5312.11
5313.11

SCIENCE
(Experimental)

Written by Leonard O. Payne
for the
DIVISION OF INSTRUCTION
Dade County Public Schools
Miami, Florida
1971

DADE COUNTY SCHOOL BOARD

Mr. William Lehman, Chairman
Mr. G. Holmes Braddock, Vice-Chairman
Mrs. Ethel Beckham
Mrs. Crutcher Harrison
Mrs. Anna Brenner Meyers
Dr. Ben Sheppard
Mr. William H. Turner

Dr. E. L. Whigham, Superintendent of Schools
Dade County Public Schools
Miami, Florida 33132

Published by the Dade County School Board

Copies of this publication may be obtained through

Textbook Services
2210 S. W. Third Street
Miami, Florida 33135

TABLE OF CONTENTS

	Page
Course Description	1
Enrollment Guidelines	1
State Adopted Texts	1
Performance Objectives	2
Course Outline	3
Demonstrations	4
Experiments	5
Projects and Activities	6
Reports	9
Additional Innovative Activities	10
Field Trips	11
Speakers or Resource People	12
Films	13
Models	14
Related Problems	14
References	15
Master Sheet	17

INTRODUCTION TO THE PLANT WORLD

COURSE DESCRIPTION:

This is a laboratory oriented course for the very low achievers in which we would try to let the pupil know how plants are involved in every aspect of his life. Detailed practical experience in handling and investigating plants and plant growth; use of films, models, and field trips in the local area are combined with basic minimal research to guide the student into a better understanding of the importance of the plant kingdom.

ENROLLMENT GUIDELINES:

"Introduction to the Plant World" is a very basic course. No prior science course work is required for success.

STATE ADOPTED TEXTS:

1. Thurber, Walter A. and Kilburn, Robert E. Exploring Life Science. Boston: Allyn and Bacon, Inc., 1966.

2. Oxenhorn, Joseph and Idelson, Michael. Pathways in Science Biology 1, 2, 3. New York: Globe Book Co., 1968.

PERFORMANCE OBJECTIVES

The student will:

1. Given a plant, identify the various parts.

2. Given a group of plants, distinguish between edible and non-edible plants.

3. Given a group of common plants, identify them.

4. Given a packet of seeds or small plants, apply selected techniques of planting and cultivation to effect their successful growth.

5. Given a variety of plants and/or seeds, find ways to propagate them.

6. Given a growing plant, prepare a graph illustrating growth over a period of time.

7. Given the leaves, stem, flowers and seeds of plants, differentiate each.

8. Given different types of soils, investigate growth of plants and record results.

9. Given a group of strange and unusual plants, identify and classify them.

10. Given samples or models of useful plants, recognize and classify food plants and industrial plants.

11. Given a collection of commonly used items, identify those of plant origin.

COURSE OUTLINE

I. The different groups of plants

A. Simple plants
1. Algae and fungi
2. Mosses

B. Complex plants

II. The parts of plants

A. Roots

B. Stems

C. Leaves

D. Flowers

E. Seeds

III. How plants multiply

A. Seeds

B. Cuttings

C. Air layering

D. Budding

E. Spores

IV. Strange and unusual plants

A. Insectivorous plants

B. Sensitive plants

C. Land building plants

V. Useful plants

A. Food plants
1. Cereals
2. Vegetables
3. Tropical fruits

B. Industrial plants and plant products
1. Fiber plants
2. Medicinal plants
3. Spice plants
4. Beverage plants

DEMONSTRATIONS

Watkins, John V. Plant Propagation for Florida Homes. Tallahassee: Bulletin No. 178, State of Florida Department of Agriculture, October, 1961.

1. Plant propagation (seedage) pp. 33-36
2. Cuttage p. 8
3. Budding p. 26
4. Layerage p. 23
5. Division p. 25
6. Management of Growing Plants pp. 37-40

Schneider, Herman & Mina. Science in Your Life (Four). Boston: D. C. Heath and Company, 1961.

7. Preparing sweet potatoes for planting pp. 268-269
8. Preparing white potatoes for planting p. 272

Thurber, Walter A. & Kilburn, Robert E. Exploring Science Seven. Atlanta: Allyn and Bacon, Inc., 1965.

9. The Growth of Plants pp. 305-323

Brandwein, Paul F.; Beck, Alfred D.; Strahler, Violet; Hollingworth, Leland G.; Brennan, Matthew J. The World of Matter. New York: Harcourt, Brace and World, Inc., 1964.

10. Testing fabrics and materials to determine origin. p. 44
11. Investigating topsoil pp. 70-71
12. Finding out about humus p. 71
13. What soil minerals have to do with plant growth pp. 71-72
14. How much water is needed for plant growth pp. 73-76
15. Soil minerals and plant life pp. 77-80
16. Saving the soil pp. 80-87

Overbeek, Johannes van & Wong, Harry K. The Lore of Living Plants. Washington D. C.: National Science Teachers Association, 1964.

17. Hormones that change growth patterns pp. 114-121

EXPERIMENTS

Thurber, Walter and Kilburn, Robert. Exploring Life Science. Atlanta: Allyn and Bacon, Inc., 1966.

1. Parts of Seeds (pp. 338-339)
2. Germination of Seeds (pp. 340-341)
3. Respiration of Seeds (pp. 342-343)
4. Growth of Seeds (pp. 344-345)
5. Cuttings (pp. 348-349)
6. Grafts (pp. 350-351)
7. Bulbs (p. 353)
8. Growth (p. 356)
9. Response to pruning (p. 362)
10. Twining Behavior (pp. 362-363)
11. Response to Light (p. 360)

Brandwein, Beck, Strahler, Hollingworth, Brennan. The World of Living Things. New York: Harcourt, Brace and World, Inc., 1964.

12. Root and Stem Growth (p. 85)
13. Diffusion (p. 82)
14. Absorption and food storage (pp. 82-83)
15. Stem structure and function (pp. 83-84)

PROJECTS AND ACTIVITIES

1. Make plantings of various kinds of plants from seeds, cuttings, budding, division, layering.

2. Keep a notebook of reports, responses, graphs, results, drawings. Record successes and failures, and reasons for failures of planting activities.

3. Collect seeds, leaves, and true leaves from wild and cultivated seedlings. Press the leaves between sheets of magazines or newspaper. Mount pressed leaves on art paper and label correctly.

4. Make a propagating case for rooting cuttings. Glass panes may be held together with masking or adhesive tape. Cuttings are propagated in moist soil, sand, or vermiculite.

5. Slice the top from a pineapple and set the top in moist sand. After the top has rooted, plant it in soil in the school garden or at home in a sunny place. Carrot tops may be cut off and set in dish of water. Observe similarities to rooting and growth of pineapple. Can the carrot be transplanted to the garden soil with success?

6. Sprout corn and bean seeds between moist paper towels and observe the sprouting process; the response to gravity; microscopic examination of root hairs; growth pattern. Record results of project and observations.

7. Collect, arrange, label a display of various seeds according to:
   a. means of travel
   b. color and shape
   c. common varieties
   d. flower, fruit, nuts
   e. edible and non-edible

8. Find whether seeds grow faster because they have been soaked before being planted.

9. Individual project: Have a taped interview with the Agricultural Agent, or High School Agriculture Teacher by one or two students. Use a preplanned set of questions compiled by the class on the subject of plants and plant studies in the high school. Include questions on job availabilities in the field of plants and plant propagation.

10. Push wire screening into a jar to form a basket. Lay a white potato that is just beginning to sprout in the basket and add enough water to touch the potato. Keep the potato in a shaded place. Watch the development of new potatoes.

11. Make a list of major crops in the country. Write after each the means by which the crop is reproduced. For example: wheat from seeds; potatoes from tuber cuttings, etc.

12. Find how rose bushes are propagated in nurseries. Write a report on the findings and present it to the class. Find how rose cuttings grow in the open soil using quart glass jars.

13. Visit a nursery or garden center and observe how plants are propagated and cared for.

14. Study the effects of pruning on selected house plants. (Refer to text Exploring Life Science p. 362) Geranium or coleus may be used with similar results. Be sure to use two plants of the same kind.

15. Build and maintain a terrarium in an aquarium tank or large jar. (Refer to The World of Living Things. p. 211)

16. Examine plants growing in your area. Prepare lists of various kinds of plants, and explain the adaptations that enable these plants to survive and to do well in this area. Look for specialized leaf structure, stem and root structures. Note, also, the surroundings in which the plants grow; specifically soil and moisture availability.

17. Adopt a tree. (Refer to The World of Living Things, pp. 210-211) "Select a tree in your neighborhood. Find out its name by using a tree identification book if you do not already know it. Is the tree native to the region, or has it been introduced to it? How healthy is the tree? Is it afflicted with insects or fungi? Are there any dead limbs? What kind of animals make their home in the tree? Record the changes that take place throughout the four seasons of the year, using, if possible, photographs you have taken to illustrate these changes."

18. Wood Products. (Refer to The World of Living Things, p. 211) "List five or more wood products in use in your home, in your school, and in industry. Try to find out which type of wood is preferred for different purposes. For example, a butcher's block is generally made of sycamore wood."

19. Visit a lumber yard. Obtain samples of various kinds of woods sold and used in this area. Sand, polish, and shape to prepare a display of the various woods complete with labels, and general usage of particular woods.

20. Set up a plant exhibit or group of exhibits which show:
    a. specimens of green plants
    b. specimens of fungus plants
    c. specimens of algae
    d. specimens of seeds and fruits from flowering plants
    e. mold gardens

21. Using a microscope examine: a. part of a leaf, b. a spore, c. pollen, d. root hairs, e. chlorophyll in various coleus leaves. Record observations.

22. Make a display of a plant cycle. (Refer to The World of Living Things, p. 99)

23. Find where and how the green plant fits into the food chain. Prepare a bulletin board display showing the importance of the plant in the food chain.

24. Find out what is meant by the Balance of Nature. Prepare a report to present to the class.

25. Investigate plant and animal population changes near your home through the years. Which animals and plants once living in the region are no longer there? Which new plants and animals have taken their place? Show the data on a chart.

26. Investigate the Venus flytrap. Grow this plant from bulbs, and study its feeding habits.

27. Interview a farmer. What is a weed? Ask a farmer who raises corn, beans, tomatoes, etc. Make a list of plants that may be considered weeds. Make a list of true weeds.

28. Make a list of wild flowers and plants native to this area.

29. Make a list of plant-eating animals: (Refer to The World of Living Things, p. 216)

30. List important minerals essential for good plant growth.

31. Find the important lumber producing regions in our nation. How do lumber companies keep from running out of trees?

32. List several products obtained from plants and trees.

33. Find how reproduction takes place in the seed plant.

34. Find how the farmer saves his soil by good soil conservation practices.

35. Find how important the study of conservation is to those who work with plants and plant propagation.

36. Make a model of a large vegetable farm. (Refer to The World of Living Things, p. 239). Show how the farmer uses correct plowing procedures to help conserve the soil and prevent erosion. What other practices does the farmer use to conserve and rebuild soil?

37. Look for erosion. Tour school grounds and nearby areas. What recommendations would you make to stop erosion from getting worse?

38. Investigate cactus plants. (Refer to The World of Living Things, p. 207). Find why the cactus is an important desert plant.

39. Investigate the interdependence of living things and their environment. Include how important the plant community is to the other living things and how an ecological community changes when a tree is cut down or is struck by lightning.

REPORTS

1. Using library research materials, prepare a chart showing different kinds of foods man gets from plants. List on the chart the part of the plant that is usually eaten; for example, (carrot, the root is eaten, celery, the stem is eaten) the root, stem, leaf, flower, fruit, or seed.

2. Propagation of Plants

3. The History of Corn

4. Life and work of:

   a. Luther Burbank
   b. George Washington Carver
   c. Others

5. Forest Products. Write to Forest Products Industries, 1816 N. St., N. W., Washington, D. C. for information about forests and forest products.

6. Strange and unusual plants

7. The Importance of the Mangrove in Land-building in the Florida Keys.

8. Plants used for Industrial Purposes - Medicines, Dye Making, Naval Products, Pulp Wood.

ADDITIONAL INNOVATIVE ACTIVITIES

1. Poling, Donald and Mier, Robert. Environments for Plants. "The Science Teacher" Vol. 37, No. 3, pp. 77-82.

   "Authors' Note: The authors worked with scientists at the U. S. Department of Agriculture's Agricultural Research Center at Beltsville, Maryland, during the summer, developing classroom activities based upon actual research projects. They became familiar with the plant-environment research being done in the Agricultural Research Service's new Phyto Engineering laboratory. In addition to reporting their findings, they offer some how-to-do-it information on building low-cost, easy-to-construct greenhouses and growth chambers for school use. The authors are still consulting with the scientists to improve the equipment they are now testing in their classrooms."

2. Work with Custodian for ground maintainance on landscaping local school grounds.

3. Locate part-time after school job at local nursery or garden center.

4. Begin and continue home garden project.

5. Begin a lawn and landscaping business.

FIELD TRIPS

1. Dade County Redland Fruit and Spice Park
   24801 S. W. 187 Ave., Rt. #2 Telephone 247-5727

   Contact: Recreation Specialist Supervisor
   Larry Contri ... 371-3531 for guided tour.
   Visiting time: 8:00 A. M. -- 4:30 P. M. Daily
   Size of Group: 150 students
   Time required: 90 minutes
   Resources available for classroom use: Speakers - Specimens
   No admission

2. Fairchild Tropical Garden
   10901 Old Cutler Road Telephone 667-1651

   Contact: Any person on duty
   Visiting time: 10:00 A. M. — 4:00 P. M. Reservations are for 10 A. M. only.
   Size of Group: At least 20 for a reservation
   Time required: 40 minutes (guided tour by tram)
   Admission: charge for tram tour only 25¢ per student
   Resources available for classroom use: books and booklets about tropical botany on sale at the gift shop.
   Books on Florida history

3. City of Miami Beach Garden Center and Conservatory
   2000 Garden Center Drive, Miami Beach Telephone 538-6352

   Contact: R. C. Kunditz, Horticulturist
   Notification: 10 days
   Visiting time: 10:00 A. M. — 3:30 P. M.
   Time required: one hour
   Size of Group: 40 maximum
   Grade level: fifth through twelfth
   No admission
   Resources available for classroom use: Horticultural Bulletins

4. Miami School Farm
   10200 N. W. 17th Avenue Telephone 696-6721

   Contact: Coordinator
   Notification: two weeks
   Visiting time: 9:00 A. M. — 3:00 P. M.
   Time required: About 40 minutes
   Size of class: 30 to 35
   Grade level: ninth through twelfth
   No admission
   Resources available for classroom use: None specified.

5. Everglades National Park
State Road 27, 10 miles southwest of Florida City
(all arrangements must be made by mail)

Contact: Superintendent, P. O. Box 279, Homestead
Notification: one week
Visiting time: most interesting during winter months
Time required: 2 hours
Size of Group: 2 or more classes
Grade level: all grades
No admission
Resources available for classroom use: None specified.

SPEAKERS OR RESOURCE PEOPLE (possible)

1. The local high school Vocational Agriculture teacher.
2. The County Agent
3. Representative of Sub-Tropical Experiment Station
4. Representative of the local garden club
5. Representative of Dade County Parks and Recreation Department
6. Representative of seed companies (Asgrow)
7. Representative of fertilizer companies
8. Representative of Farm Bureau
9. Representative of the Florida Farmers Market Association
10. Custodian in charge of grounds maintenance

1. Adaptations in Plants
   AV#1-11107, 15 minutes, C
2. Birth of a Florida Key
   AV#1-12252, 18 minutes, C
3. Carnivorous Plants
   AV#1-02323, 10 minutes, C
4. Characteristics of Plants and Animals
   AV#1-02215, 10 minutes, C
5. Color of Life
   AV#1-30664, 24 minutes, C
6. Flowers and Their Purpose
   AV#1-11105, 15 minutes, C
7. Flowers at Work
   AV#1-02349, 11 minutes, BW
8. Flying Seeds
   AV#1-02322, 10 minutes, BW
9. Gift of Green
   AV#1-11090, 20 minutes, C
10. Plant Life at Work
    AV#1-02280, 10 minutes, C
11. Plant Traps
    AV#1-02327, 11 minutes, C
12. Plants Obtain Food
    AV#1-11100, 15 minutes, C
13. Secrets of the Plant World
    AV#1-11096, 13 minutes, C
14. Why Foods Spoil
    AV#1-11549, 14 minutes, C
15. Growth of Flowers
    AV#1-02354, 14 minutes, C
16. Growth of Seeds
    AV#1-11103, 14 minutes, C
17. Leaves
    AV#1-02262, 10 minutes, BW
18. Plant Growth
    AV#1-02273, 10 minutes, BW

MODELS AVAILABLE FROM DADE COUNTY AUDIOVISUAL CENTER

1. Poisonous Plants—Set 1 AV#6-00105
   C 6 PEJS Museum of Science
2. Poisonous Plants—Set 2 AV#6-00106
   C 6 PEJS Museum of Science
3. Poisonous Plants—Set 3 AV#6-00170
   C 7 PEJS Museum of Science

RELATED PROBLEMS

1. Measuring the effects of freezing on plants.
   Thurber & Kilburn, Exploring Life Science p. 92

2. Measuring the effects of overheating on plants.
   Thurber & Kilburn, Exploring Life Science p. 95

3. Calculating the percentage of germination.
   Thurber & Kilburn, Exploring Life Science p. 364, #7

4. Recording growth of seedlings using a graph.
   Thurber & Kilburn, Exploring Life Science p. 364, #3

5. Studying Growth differences in seedlings and methods of recording daily changes.
   Thurber & Kilburn, Exploring Life Science pp. 356-363

6. Examine and measure plants that have twining or climbing habits.
   Thurber & Kilburn, Exploring Life Science pp. 362-363

REFERENCES

1. Beiser, Arthur, and the Editors of Life Magazine. The Earth. New York: Time-Life Books, 1962.

2. Brandwein, Paul F.; Beck, Alfred D.; Strahler, Violet; Hollingworth, Leland G.; Brennan, Matthew J. The World of Living Things. New York: Harcourt, Brace and World, Inc., 1964.

3. Brandwein, Paul F.; Beck, Alfred D.; Strahler, Violet; Hollingworth, Leland G.; Brennan, Matthew J. The World of Matter-Energy. New York: Harcourt, Brace and World, Inc. 1964.

4. Dodge, Bertha A. Plants That Changed the World. Boston: Little, Brown and Co., 1959.

5. Galston, Arthur W. The Green Plant. Englewood Cliffs, New Jersey: Prentice-Hall, 1968.

6. Hargreaves, Dorothy and Bob. Tropical Trees. Hawaii: Hargreaves Company, 1965.

7. Hawkes, Alex D. Orchids: Their Botany and Culture. New York: Harper and Row, 1961.

8. Huntington, Harriet E. Forest Giants, the Story of California Redwoods. New York: Doubleday, 1962.

9. Hutchins, Ross E. This Is a Leaf. New York: Dodd, Mead and Co., 1962.

10. Jaeger, Paul. The Wonderful Life of Flowers. New York: Dutton, 1961.

11. Leopold, A. Starker, and the editors of Life. The Desert. New York: Time-Life Books, 1961.

12. Maxwell, Lewis S. Florida's Poisonous Plants, Snakes, Insects. Tampa, Florida: Maxwell, 1963.

13. Meachem, William L. An Easy Guide to African Violets. New York: Hearthside Press Inc., 1962.

14. Milne, Lorus J. and Margery. The Balance of Nature. New York: Knopf, 1960.

15. Overbeek, Johannes van & Wong, Harry K. The Lore of Living Plants. Washington D. C.: National Science Teachers Association, 1964.

16. Roberts, Martha McMillan. Public Gardens and Arboretums of the United States. New York: Holt, Rinehart and Winston, 1962.

17. Schery, Robert W. Plants for Man. Englewood Cliffs, New Jersey: Prentice-Hall Inc., 1952.

18. Schneider, Herman and Nina. Science In Your Life, Book 4 Boston: D. C. Heath and Company, 1961.

19. Smith, Jean. Find a Career in Conservation. New York: Putnam, 1959.

20. Teale, Edwin Way. Journey Into Summer. New York: Dodd, Mead and Co., 1960.

21. Thurber, Walter A. and Kilburn, Robert E. Exploring Life Science. Atlanta: Allyn and Bacon, Inc., 1966.

22. Watkins, John V. Plant Propagation for Florida Homes. Tallahassee: Bulletin No. 178, State of Florida Department of Agriculture, October, 1961.

23. World Book Encyclopedia, Teaching Plan No. 30. Conservation. Chicago: Field Enterprises, Inc., 1953.

24. World Book Encyclopedia, Teaching Plan No. 53. Farming. Chicago: Field Enterprises, Inc., 1953.

25. Zim, Herbert S. Plants: A Guide to Plant Hobbies. New York: Harcourt, Brace and World, 1947.

MASTER SHEET - INTRODUCTION TO THE PLANT WORLD

Objective	Texts	Experiment Labs	Speakers	Projects	Reports	Field Trips	Demonstrations	Films	Film Loops	Discussion Questions	Slides	Additional Activities	Math Related Questions	Models	Reference
1	1-2	1,2	2	20,16, 28,7		1		4,5				2		1-2-3	12,5, 25
2	1-2		3	1,2,7, 16	3	1,2,5		14				2		1-2-3	13, 12
3	1-2		5	23,6, 16,20	1	1,5		6,7				3	3		6,10
4	1-2	1,2,3, 4,8	6	1,2,8	1		10,11, 12,13, 14	8,16				2,4			23,24
5	1-2	1,2,3, 4,5,6, 7	2,1	4,5,6,9	8	2,4	1,2,3, 4,5,6, 7,8	13				1	4		22,20, 25,13, 19
6	1-2	8,9		2	1		9	9,12				2	5,6		15
7	1-2	10,13		2,9, 21,22	8	2		17,18				4			14
8	1-2	8,9, 10,11	7,8	1,2,7, 30,34		5	9	1		26, 34-37		5	1		11, 1
9	1-2			2,9, 13,26	7	1,2,3		2,3,11		27,29, 38		5			4,7,16
10	1-2	4		2,3,7, 11,19, 20,27, 32,18, 38	1,7, 8,5		10,11, 12			31,32					8,17, 3
11	1-2					5									